United States Court of Appeals for the Federal Circuit

98-1160

PERSONALIZED MEDIA COMMUNICATIONS, LLC,

Appellant,

v.

INTERNATIONAL TRADE COMMISSION,

Appellees,

and

DIRECTV, INC., UNITED STATES SATELLITE BROADCASTING CO.,
HUGHES NETWORK SYSTEMS, and
HITACHI HOME ELECTRONICS (AMERICA), INC.,

Intervenors,

and

THOMSON CONSUMER ELECTRONICS, INC.,
TOSHIBA AMERICA CONSUMER PRODUCTS, INC., and
MATSUSHITA ELECTRIC CORPORATION OF AMERICA,

Intervenors.

DECIDED: November 24, 1998

Before RICH, MICHEL and LOURIE, Circuit Judges.

LOURIE, Circuit Judge.

Personalized Media Communications, LLC ("PMC") appeals from the final determination of the United States International Trade Commission ("the Commission")

that claims 6, 7, and 44 of PMC's patent are not infringed and are invalid for indefiniteness. See In re Certain Digital Satellite Sys. (DSS) Receivers & Components Thereof, No. 337-TA-392 (Int'l Trade Comm. Oct. 20, 1997) (Initial Determination), aff'd in part, (Int'l Trade Comm. Dec. 4, 1997) (Final Determination). Because the Commission erred in concluding that the asserted claims are invalid for indefiniteness and that claim 7 was not infringed, but did not err in concluding that claim 6 was not infringed, we affirm-in-part, reverse-in-part, vacate-in-part, and remand. We decline to address PMC's argument concerning infringement of claim 44.

BACKGROUND

A. The Patented Technology

PMC is the assignee of United States Patent 5,335,277, which pertains generally to systems for use in television broadcasting. The '277 patent specification is quite long; it spans 328 columns and 22 drawing sheets, and contains numerous embodiments of the claimed inventions. Only those embodiments that are necessary to understand the claims at issue are described herein.

The system of the '277 patent includes a unique receiver station that detects and manipulates digital control signals that are embedded in a complex broadcast or cablecast transmission. The specification highlights several benefits that result from the detection and use of the control signals. For example, the control signals can be detected by receiver stations and used to select a specific program from a multi-channel programming transmission. See '277 patent, col. 17, l. 63 to col. 18, l. 2. The control signals can alternatively be used to remotely control the operation of peripheral devices such as VCRs. See id., col. 10, ll. 34-39.

As explained in the specification, a given broadcast can contain several control signals which appear at varying "locations" within the broadcast:

> In programming transmissions, given signals may run and repeat, for periods of time, continuously or at regular intervals. Or they may run only occasionally or only once. They may appear in various and varying locations. In television they may appear on one line in the video portion of the transmission such as line 20 of the vertical interval,[1] or on a portion of one line, or on more than one line, and they will probably lie outside the range of the television picture displayed on a normally tuned television set. In television and radio they may appear in a portion of the audio range that is not normally rendered in a form audible to the human ear. . . . In all cases, signals may convey information in discrete words, transmitted at separate times or in separate locations, that [the] receiver apparatus must assemble in order to receive one complete instruction.

Id., col. 9, l. 61 to col. 10, l. 16. Because the location of a given control signal can vary within the transmission, a controller within the system can be programmed or "preinformed" with this location information or other information concerning the control signal in order to identify only the relevant control signal while disregarding other signals. This is also explained in the specification, which notes that "the pattern of the composition, timing, and location of embedded signals may vary in such fashions that only receiving apparatus that are [sic] preinformed regarding the patterns that obtain at any given time will be able to process the signals correctly." Id., col. 9, ll. 43-47.

These aspects of the disclosure are addressed in asserted claims 6 and 7 of the '277 patent, which read as follows:

> 6. A system for identifying a predetermined signal in a television program transmission in which a plurality of signal types are transmitted[,] said signal being transmitted in a varying location or a varying timing

[1] Although the patent specification is not clear as to the meaning of the words "vertical interval," a term of art, we understand them to refer to a portion of the video broadcast that is not normally visible on a television set.

pattern, said television program transmission being separately defined from standard analog video and audio television, said system comprising:

a digital detector for receiving said transmission and detecting said predetermined signal in said transmission based on either a specific location or a specific time; and

a controller operatively connected to said detector for causing said detector to detect said predetermined signal based on either a specific location or time, said controller being programmed with either the varying locations or the varying timing pattern of said signal.

7. A system for locating or identifying a specific signal in a television program transmission that contains digital information and for assembling information contained in said specific signal, said transmission being separately defined from standard analog video and audio television, said system comprising:

a digital detector for receiving at least some information of said transmission and detecting said specific signal at a specific location or time;

a storage device operatively connected to said digital detector for receiving detected digital information of said specific signal and assembling at least some of said digital information into either information or instruction message units; and

a controller operatively connected to said detector and said storage device for causing said detector to locate, detect or output said signal and for controlling a technique used by said storage device to assemble message units, said controller being programmed with information of the composition of said signal or with either the varying location or the varying timing pattern of said signal.

Another aspect of the disclosed system relates to the ability to create a "video overlay." In one example provided in the specification, viewers see a user-customized version of a weekly television program "Wall Street Week" in which the performance of their personal stock portfolios is shown as a video overlay on top of a graph showing the market's overall performance. The details of this procedure are explained as follows:

> [The TV monitor] displays the conventional television image and the sound of the transmitted "Wall Street Week" program. During this time the program may show the so-called "talking head" of the host as he describes the behavior of the stock market over the course of the week. Then the host says, "Now as we turn to the graphs, here is what the Dow Jones Industrials did in the week just past," and a studio generated graphic is transmitted. FIG. 1B shows the image of said graphic as it appears on the video screen of the TV monitor. Then the host says, "And here is what your portfolio did." At this point, an instruction signal is generated at said program originating studio, embedded in the programming transmission, and transmitted. Said signal is identified by [the decoder at the receiver station], transferred to [the microcomputer,] and executed by the microcomputer [] at the system level as the statement, "GRAPHICS ON." Said signal instructs [the microcomputer] to overlay the graphic information in its graphics card onto the received composite video information and transmit the combined information to [the TV monitor]. [The TV monitor] then displays the image shown in FIG. 1C which is the microcomputer generated graphic of the subscriber's own portfolio performance overlaid on the studio generated graphic.

Id., col. 16, ll. 21-48. Other embodiments disclose the use of a "local input" that may be used by the customer to interact with the programming content in a more flexible manner. See, e.g., id., col. 161, l. 53 et seq.

These aspects of the disclosure are addressed in asserted claim 44, which reads as follows:

> 44. A television receiver system comprising:
>
> a television receiver for receiving a selected broadcast or cable cast television transmission and transferring television programming in said transmission to a television display;
>
> an input device for inputting information of the reaction of a viewer to specific television program content;
>
> a digital detector operatively connected to a mass medium receiver for detecting digital information in a mass medium transmission and transferring some of said detected information to a processor[;]
>
> a processor operatively connected to said detector and said input device for generating and outputting information of a video overlay that is related to said television programming or said reaction information; and

a television display device operatively connected to said processor for receiving and displaying said video overlay.

B. The Proceedings Before the Commission

PMC filed a complaint with the Commission asserting that the various Intervenors[2] herein were importing Digital Satellite Systems (DSSs) that infringed claims 6, 7, and 44 of PMC's '277 patent in violation of 19 U.S.C. § 1337(a) (1994) ("Section 337"). In response, the Commission instituted an investigation on December 18, 1996, see 61 Fed. Reg. 66695-96 (1996), which culminated in a 450-page Initial Determination in which the Administrative Law Judge (ALJ) recommended that the Commission conclude that Section 337 had not been violated. Specifically, the ALJ concluded that: (1) the asserted claims were invalid as indefinite under 35 U.S.C. § 112, ¶ 2; (2) the asserted claims were invalid as not enabled under 35 U.S.C. § 112, ¶ 1; (3) claim 7 is invalid as anticipated under 35 U.S.C. § 102; and (4) no asserted claim was infringed. PMC petitioned the Commission to review the Initial Determination. The Commission determined not to review, and thereby adopted, the ALJ's various claim constructions and his conclusions that the claims were indefinite and not infringed. See Final Determination at 2. However, the Commission took "no position" on the remaining issues addressed in the Initial Determination. See id. Accordingly, only the ALJ's claim construction, indefiniteness, and noninfringement determinations are before this court.[3]

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[2] Because the Intervenors and the Commission generally make the same arguments to this court in support of the Commission's decision, we refer to them collectively for convenience as "the Commission."

[3] See Beloit Corp. v. Valmet OY, 742 F.2d 1421, 1423, 223 USPQ 193, 194 (Fed. (continued . . .)

1. Indefiniteness

The ALJ's indefiniteness determination turned upon his conclusion that the claim limitation "digital detector for . . . ," a limitation appearing in all of the asserted claims, constituted a means-plus-function limitation to be construed in accordance with 35 U.S.C. § 112, ¶ 6 (1994). The ALJ interpreted this limitation to be "a functional phrase, not limited to particular structure." Initial Determination at 82. The ALJ first consulted dictionary definitions, but found that "dictionary definitions of 'detector,' digital,' and 'digital circuit' do not resolve the question whether the entire phrase digital detector conveys specific structure to one of ordinary skill in the art." Id. at 67. The ALJ also found that the specification lacked a "specific structure" for a "digital detector," but instead merely described a digital detector in functional terms, i.e., as a device that "acts to detect the digital signal information embedded in [the information which constitutes the video transmission]." Id. at 70 (citing '277 patent, col. 21, ll. 46-47).[4] Finally, the ALJ referenced the testimony of various experts to the effect that while one of ordinary skill would understand a "digital detector" to refer to a detector of digital information, the phrase lacked a specific structure and could not be built by those of ordinary skill. See id. at 73-82.

Having concluded that the scope of the term "digital detector" was governed by § 112, ¶ 6, the ALJ consulted the specification to determine whether it contained

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Cir. 1984) (noting that the Commission may at its discretion review only certain dispositive issues resolved in the Initial Determination).

[4] Apart from similar textual descriptions, the specification does not detail the circuitry comprising a "digital detector." The relevant figures disclose "digital detectors" merely as functional blocks. See '277 patent, Fig. 2A.

corresponding structure, but, as already mentioned, found none. Accordingly, and relying on In re Dossel, 115 F.3d 946, 42 USPQ2d 1881 (Fed. Cir. 1997),[5] the ALJ concluded that the term "digital detector" was indefinite and held the claims invalid.

2. Noninfringement

a. Claims 6 and 7

The ALJ considered two arguments concerning infringement by the accused DSSs. The first turned on PMC's proffered construction of the claim term "location." The ALJ concluded, based in large part on the portion of the specification quoted supra, that the term "location" included "a line, or lines, or portion of a line in the vertical interval of a television video transmission, or a frequency within the audio range of a television transmission." Initial Determination at 88. Accordingly, the ALJ rejected PMC's argument that the term "location" refers to the "carrier wave"[6] of the control

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[5] In Dossel, we stated that a claim containing a means-plus-function element will generally be held indefinite if the specification does not contain an adequate disclosure of structure corresponding to the function of the claims. See Dossel, 115 F.3d at 946, 42 USPQ2d at 1885 (citing In re Donaldson Co., 16 F.3d 1189, 1195, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994) (en banc)). Despite this general rule, in Dossel we held, on "specific facts," a means-plus-function claim not invalid for indefiniteness under § 112, ¶ 2 even though the algorithmic structure corresponding to "means for reconstructing" was not specifically disclosed in the written description. See id. at 946-47, 42 USPQ2d at 1885 ("Neither the written description nor the claims uses the magic word 'computer,' nor do they quote the computer code that may be used in the invention. . . . [However, w]hile the written description does not disclose exactly what mathematical algorithm will be used to compute the end result, it does state that 'known algorithms' can be used to solve standard equations which are known in the art."). The ALJ here found Dossel's "specific facts" distinguishable from the present case. See Initial Determination at 140.

[6] Understanding PMC's argument requires a brief explanation of television broadcast technology. When a television program is broadcast, the program information or "baseband" signal is enveloped within a "carrier wave" whose frequency corresponds to a particular television channel. This process is known as "modulation." When the modulated signal is received at a given television set, the tuner of the set is

(continued . . .)

signal of the claims; and therefore that selection of a given carrier wave in a multi-channel transmission is a selection of a control signal based on its location. See id. at 93. The ALJ, inter alia, found PMC's proffered construction to conflict with the requirement of the claims that the control signal appear in a "television program transmission," which the ALJ construed as referring to a single-channel and not a multi-channel transmission. Id. at 89-90.

The second infringement argument concerned the use of Service Channel IDs (SCIDs) in the accused DSSs. The function of a SCID was explained by a witness for one of the intervenors as follows:

> [A] single data stream [comes] into the tuner, demodulator, and Forward Error Correction circuitry. After this point, the single data stream goes into the Transport IC, where the individual packets of data . . . are looked at and, if the SCID of the packet matches the SCID of the selected channel, those video and audio data packets are then [decoded]. There is no location or timing pattern associated with the data processing. These packets arrive in a[n] unpredictable order with unpredictable timing.

Id. at 228. Central to the ALJ's conclusion that the SCID does not constitute the control signal of the claims and thus does not infringe was his conclusion that the SCID is "information of the 'composition'[7] of a signal; rather than its 'location.'" Id. at 228. The

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used to select a given carrier wave in accordance with its frequency. The selected carrier wave is then "demodulated" such that the carrier wave is in essence stripped away, revealing the baseband signal, which is then used directly by the circuitry of the set to display the picture.

[7] The specification provides insight into what constitutes the "composition" of signal information. For example, one signal's composition commences with "header" information, followed by an "execution segment," a "meter-monitor segment," and an "information segment." See '277 patent, col. 27, ll. 37-47.

The ALJ concluded that the "header" information disclosed in the '277 patent was "the equivalent of" the SCID of the accused devices. See Initial Determination at 229.

ALJ was assisted in this conclusion by the fact that claim 7 draws a distinction between a signal's composition and its location.[8] The ALJ thus concluded that the accused DSSs did not identify the SCID at a "specific location" and therefore did not infringe either claim 6 or 7. See id. at 230, 233.

b. Claim 44

PMC's theory concerning infringement of claim 44 was summarized by the ALJ as follows:

> [PMC argues] that a user of the accused DSS system may be tuned to a pay-per-view channel on which the DBS broadcast is intended to solicit the viewer to buy the program by displaying film clips from the movie as well as discussions with the director and actors; that if the viewer presses the appropriate button on the keypad of the remote control, indicating that the user wants more information about the program, the processor in the DSS receivers will generate an overlay displaying additional information about the program such as the start time, title and rating of the program; that the DSS receivers display video overlays related to "the television program" such as an information banner, which includes [similar information]; and that the DSS receivers display the Program Guide, which is a video overlay displaying [similar information] and is generated in response to the viewer pressing the appropriate button on the remote control.

Id. at 234. The ALJ found that the accused DSSs did not infringe claim 44 because they did not "have the capacity to generat[e] and output[] information of the video overlay that is related to 'said television programming' or 'said reaction information' as required by claim 44." Id. at 235 (emphasis in original). More specifically, the ALJ found that

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[8] Claim 7 reads in relevant part: "said controller being programmed with information of the composition of said signal or with either the varying location or the varying timing pattern of said signal." (emphasis added).

> it is undisputed that when the DSS system is in use, i.e., receiving a "mass-medium transmission" and generating a "video overlay," the [portion of the DSS system that corresponds to the claimed "television receiver"] is not capable of receiving a "television transmission[", and] therefore [cannot] transfer "television programming" from said transmission to the ["television display"].

Id. at 235-36.

PMC appealed the judgment to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(6) (1994).

DISCUSSION

We review factual findings of the Commission under the "substantial evidence" standard. See 19 U.S.C. § 1337(c) (1994) (stating that those adversely affected by a Section 337 determination may appeal to this court for review in accordance with chapter 7 of Title 5); 5 U.S.C. § 706(2)(E) (1994) (setting forth the "substantial evidence" standard of review); Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821, 832, 20 USPQ2d 1161, 1171 (Fed. Cir. 1991). Under this standard, we will not disturb the Commission's factual findings if they are supported by "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." Surface Tech., Inc. v. United States Int'l Trade Comm'n, 801 F.2d 1336, 1340-41, 231 USPQ 192, 196 (Fed. Cir. 1986). We review the Commission's legal determinations de novo. See 5 U.S.C. § 706(2)(A) (1994); YBM Magnex, Inc. v. International Trade Comm'n, 145 F.3d 1317, 1320, 46 USPQ2d 1843, 1845 (Fed. Cir. 1998).

"An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." Markman

v. Westview Instruments, Inc., 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370, 38 USPQ2d 1461 (1996). The first step, claim construction, is a question of law which we review de novo. See Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc). The second step is factual. See North Am. Vaccine, Inc. v. American Cyanamid Co., 7 F.3d 1571, 1574, 28 USPQ2d 1333, 1335 (Fed. Cir. 1993). When construing a claim, a court principally consults the evidence intrinsic to the patent, viz., the claims themselves, the written description portion of the specification, and the prosecution history. See Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582-83, 39 USPQ2d 1573, 1576-77 (Fed. Cir. 1996). Whether certain claim language invokes 35 U.S.C. § 112, ¶ 6 is an exercise in claim construction and is therefore a question of law, reviewable de novo by this court. See Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1213-14, 48 USPQ2d 1010, 1016-17 (Fed. Cir. 1998) (embarking upon de novo review). Likewise, whether a claim is indefinite under 35 U.S.C. § 112, ¶ 2 is also a question of law, reviewable de novo by this court. See North Am. Vaccine, Inc. v. American Cyanamid Co., 7 F.3d 1571, 1579, 28 USPQ2d 1333, 1339 (Fed. Cir. 1993).

A. Applicability of 35 U.S.C. § 112, ¶ 6

PMC argues that the Commission erred in construing the "digital detector" limitation as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6. In support, PMC contends that the term "digital detector" recites sufficiently definite structure to prevent the application of § 112, ¶ 6 under our case law. PMC also points out that our case law makes clear that § 112, ¶ 6 should not be invoked merely because this structure takes its name in accordance with its function. Finally, PMC argues that the

lack of the term "means" in this limitation invokes a presumption that § 112, ¶ 6 does not apply. The Commission responds that the evidence of record makes it clear that one of ordinary skill in the electrical arts would not have understood the term "digital detector" to connote a definite structure, and therefore that this limitation is defined entirely by the functional language that follows the language "digital detector for . . . ." Accordingly, they contend that § 112, ¶ 6 is applicable to this limitation.

Section § 112, ¶ 6 provides that

> [a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112, ¶ 6 (1994) (emphasis added). Thus, § 112, ¶ 6 operates to restrict claim limitations drafted in such functional language to those structures, materials, or acts disclosed in the specification (and their equivalents) that perform the claimed function.

We have had several recent opportunities to assess whether certain claim language has invoked § 112, ¶ 6. In Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 39 USPQ2d 1783 (Fed. Cir. 1996), we were presented with the claim language "detent mechanism defining conjoint rotation of said shafts." In deciding that § 112, ¶ 6 was not invoked, we stated

> [T]he fact that a particular mechanism—here "detent mechanism"—is defined in functional terms is not sufficient to convert a claim element containing that term into a "means for performing a specified function" within the meaning of [§ 112, ¶6]. Many devices take their names from the functions they perform. The examples are innumerable, such as "filter," "brake," "clamp," "screwdriver," or "lock." . . . .

> "Detent" (or its equivalent "detent mechanism") is just such a term. Dictionary definitions make clear that the noun "detent" denotes a type of device with a generally understood meaning in the mechanical arts, even though the definitions are expressed in functional terms. It is true that "detent" does not call to mind a single well-defined structure, but the same could be said of other commonplace structural terms such as "clamp" or "container." What is important is not simply that a "detent" or "detent mechanism" is defined in terms of what it does, but that the term, as the name for structure, has a reasonably well understood meaning in the art.

Greenberg, 91 F.3d at 1583, 39 USPQ2d at 1786 (citations omitted). We also made clear that use of the term "means" is central to the analysis: "the use of the term 'means' has come to be so closely associated with 'means-plus-function' claiming that it is fair to say that the use of the term 'means' (particularly as used in the phrase 'means for') generally invokes [§ 112, ¶ 6] and that the use of a different formulation generally does not." Id. at 1584, 39 USPQ at 1787.

Subsequent cases have clarified that use of the word "means" creates a presumption that § 112, ¶ 6 applies, see York Prods., Inc. v. Central Tractor, 99 F.3d 1568, 1574, 40 USPQ2d 1619, 1623 (Fed. Cir. 1996) ("In determining whether to apply the statutory procedures of [§ 112, ¶ 6], the use of the word 'means' triggers a presumption that the inventor used this term advisedly to invoke the statutory mandates for means-plus-function clauses."),[9] and that the failure to use the word "means" creates

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[9] See also Unidynamics Corp. v. Automatic Prods. Int'l, Ltd., 157 F.3d 1311, 1319, 48 USPQ2d 1099, 1104 (Fed. Cir. 1998) (holding that the claim language "spring means tending to keep the door closed" invokes § 112, ¶ 6: "the recitation of 'spring,' which is structural language, [does not take] the limitation out of the ambit of the construction dictate of § 112, ¶ 6."); Serrano v. Tellular Corp., 111 F.3d 1578, 1582, 42 USPQ2d 1538, 1541 (Fed. Cir. 1997) (holding that the claim language "determination means . . . for determining" invokes § 112, ¶ 6); Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1536, 19 USPQ2d 1367, 1369 (Fed. Cir. 1991) (holding that the claim (continued . . .)

a presumption that § 112, ¶ 6 does not apply, see Mas-Hamilton, 156 F.3d at 1213, 48 USPQ2d at 1016. These presumptions can be rebutted if the evidence intrinsic to the patent and any relevant extrinsic evidence so warrant.[10] See, e.g., Cole v. Kimberly-Clark Corp., 102 F.3d at 524, 531, 41 USPQ2d 1001, 1006 (Fed. Cir. 1996) (noting that whether § 112, ¶ 6 is invoked involves an analysis of the "patent and the prosecution history," and consulting a dictionary definition of "perforation" to understand if one of

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language "means for joining said pluralities [of link ends] to one another so that the axes of [certain holes are arranged in certain configurations]" invokes § 112, ¶ 6: "The recitation of some structure in a means-plus-function element does not preclude the applicability of [§ 112, ¶ 6 when it] merely serves to further specify the function of the means. The recited structure tells only what the means-for-joining does, not what it is structurally.") (emphasis in original).

[10] See, e.g., Mas-Hamilton, 156 F.3d at 1214, 48 USPQ2d at 1017 (holding that the claim language "lever moving element for moving the lever" invokes § 112, ¶ 6: "even though the catch phrase ['means for'] is not used, the limitation's language does not provide any structure. The limitation is drafted as a function to be performed rather than definite structure or materials."); id. at 1215, 48 USPQ2d at 1017 (holding that the claim language "a movable link member for . . . " invokes § 112, ¶ 6); York, 99 F.3d at 1573-75, 40 USPQ2d at 1623-24 (holding that the claim language "means formed on the . . . sidewall portions including a plurality of spaced apart . . . members protruding from the . . . sidewall portions and forming load lock . . ." did not invoke § 112, ¶ 6: "The claim language does not link the term means to a function. . . Instead, the claim recites structure. . . . Without a 'means' sufficiently connected to a recited function, the presumption in use of the word 'means' does not operate."); Cole v. Kimberly-Clark Corp., 102 F.3d at 524, 531, 41 USPQ2d 1001, 1006-07 (Fed. Cir. 1996) (holding that the claim language "perforation means extending from the leg band means to the waist band means through the outer impermeable layer means" did not invoke § 112, ¶ 6: this language "describes the structure supporting the tearing function (i.e., perforations). The claim describes not only the structure that supports the tearing function, but also its location (extending from the leg band to the waist band). An element with such a detailed recitation of structure, as opposed to its function, cannot meet the requirements of [§ 112, ¶ 6]."); see also Unidynamics, 157 F.3d at 1319, 48 USPQ2d at 1105 (distinguishing Cole: "[We held that the claim limitation in Cole] did not meet the requirement of § 112, ¶ 6 because it not only described definite structure, perforations, that supported the described function, tearing, but also described the location and extent of the structure. Here, spring is the only recitation of structure . . . .") (citation omitted).

skill in the art would understand this term to connote structure). In deciding whether either presumption has been rebutted, the focus remains on whether the claim as properly construed recites sufficiently definite structure to avoid the ambit of § 112, ¶ 6. See Sage Prods. v. Devon Indus., Inc., 126 F.3d 1420, 1427-28, 44 USPQ2d 1103, 1109 (Fed. Cir. 1997) ("[W]here a claim recites a function, but then goes on to elaborate sufficient structure, material, or acts within the claim itself to perform entirely the recited function, the claim is not in means-plus-function format" even if the claim uses the term "means").

Taking these principles into consideration, we agree with PMC that the Commission erred in construing the term "digital detector" as a means-plus-function limitation. The "digital detector" limitation does not use the word "means," and therefore this limitation is presumed not to invoke § 112, ¶ 6. Neither intrinsic nor extrinsic evidence rebuts this presumption because the term "detector" is a sufficient recitation of structure. "Detector" is not a generic structural term such as "means," "element," or "device"; nor is it a coined term lacking a clear meaning, such as "widget" or "ram-a-fram."[11] Instead, as noted by the ALJ by reference to dictionary definitions, "detector" had a well-known meaning to those of skill in the electrical arts connotative of structure, including a rectifier or demodulator.[12] No other extrinsic evidence, including the expert

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[11] The latter of these terms was creatively coined by Judge Michel at oral argument in this case.

[12] For example, the ALJ quoted the following dictionary definition of "detector": "'(1) : a device for determining the presence of a signal (2) : a rectifier of high-frequency current (as a cat whisker and crystal or a vacuum tube) (3) : a device for extracting the intelligence from a signal (4) DEMODULATOR 1.'" Initial Determination at 66 (citation to Webster's omitted).

testimony, and no evidence intrinsic to the patent casts doubt on this conclusion. Moreover, neither the fact that a "detector" is defined in terms of its function, nor the fact that the term "detector" does not connote a precise physical structure in the minds of those of skill in the art detracts from the definiteness of structure. See Greenberg, 91 F.3d at 1583, 39 USPQ2d at 1786 (quoted supra). Even though the term "detector" does not specifically evoke a particular structure, it does convey to one knowledgeable in the art a variety of structures known as "detectors." We therefore conclude that the term "detector" is a sufficiently definite structural term to preclude the application of § 112, ¶ 6.

Much of the ALJ's analysis (and the Commission's arguments to this court) centered around the ambiguity raised by the phrase "digital detector." However, an adjectival qualification ("digital") placed upon otherwise sufficiently definite structure ("detector") does not make the sufficiency of that structure any less sufficient for purposes of § 112, ¶ 6. Instead, it further narrows the scope of those structures covered by the claim and makes the term more definite. The use of the word "digital" in conjunction with the word "detector" merely places an additional functional constraint (extraction of digital information) on a structure (detector) otherwise adequately defined. See, e.g., '277 patent, col. 21, ll. 46-47 (defining "digital detector" as a device that "acts to detect the digital signal information" in other information). Accordingly, we hold that the "digital detector" limitations in asserted claims 6, 7, and 44 recite sufficiently definite structure and therefore do not come within the ambit of § 112, ¶ 6.

B. Indefiniteness

Having decided that § 112, ¶ 6 does not apply to the "digital detector" limitation of the asserted claims, much of the support for the ALJ's rationale for declaring the claims invalid under Donaldson and Dossel disappears: See note 5, supra. However, the Commission still contends that the term "digital detector" is indefinite irrespective of the applicability of § 112, ¶ 6. Specifically, it contends that the evidence of record, particularly the expert testimony relied on by the ALJ, shows that the term "digital detector" has no well-understood meaning in the art and is therefore indefinite. PMC disagrees with the Commission's assessment of the evidence and argues that the term "digital detector" has a well-understood meaning in the art. PMC also contends that the specification clearly apprises one of ordinary skill of the scope of the term.

As mandated by the definiteness requirement of 35 U.S.C. § 112, ¶ 2, a specification shall include claims "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention" (emphasis added). Determining whether a claim is definite requires an analysis of "whether one skilled in the art would understand the bounds of the claim when read in light of the specification . . . . If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more." Miles Lab., Inc. v. Shandon, Inc., 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993). A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims. Cf. North Am. Vaccine, Inc. v. American Cyanamid Co., 7 F.3d 1571, 1579, 28 USPQ2d 1333, 1339 (Fed. Cir. 1993) ("[W]hile the parties in the midst of a dispute have disagreed concerning the meaning of the claims, the claims are not so lacking in clarity as to be invalid [as indefinite].").

We agree with PMC and conclude that the Commission erred in holding the asserted claims to be indefinite. Here, the written description of the specification is sufficient to inform one skilled in the art of the meaning of the claim language "digital detector." It explicitly defines a "digital detector" as a device that "acts to detect the digital signal information" in another stream of information.[13] See '277 patent, col. 21, ll. 46-47 (detection of digital signal in video transmission); id. at ll. 59-60 (detection of digital signal in audio transmission); id. at ll. 63-65 (detection of digital signal in "any other information portion of said television signal"); see also Beachcombers, Int'l, Inc. v. WildeWood Creative Prods., Inc., 31 F.3d 1154, 1158-59, 31 USPQ2d 1653, 1656-57 (Fed. Cir. 1994) (vacating jury verdict of indefiniteness in light of clear definition of disputed claim limitation in the written description); W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1557, 220 USPQ 303, 316 (Fed. Cir. 1983) ("The use of 'stretching . . . at a rate exceeding about 10% per second' in the claims is not indefinite. Infringement is clearly assessable through the use of a stopwatch.") (deletion in original).

The expert testimony relied upon by the parties does not alter this conclusion. Extrinsic evidence may not be relied upon during claim construction when the intrinsic evidence unambiguously defines the disputed claim language. See Bell & Howell Document Management Prods. Co. v. Altek Sys., 132 F.3d 701, 706, 45 USPQ2d 1033,

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[13] Because the written description clearly defines the scope of the term "digital detector," we reject PMC's proffered construction of this phrase to mean "demodulation circuitry for extracting digital information from a carrier signal." PMC's Opening Brief at 26.

1038 (Fed. Cir. 1997). Accordingly, because the meaning of the term "digital detector" is unambiguously set forth in the specification, the expert testimony on this issue is irrelevant to the issue of indefiniteness and cannot serve to inject ambiguity where none exists.

The Commission makes much of the fact that the specification is otherwise silent concerning the structure of a "digital detector," and it notes that the "digital detectors" of the circuit diagrams do not reveal circuit elements constituting such a device, but only portray these devices as mere functional blocks. See, e.g., '277 patent, Fig. 2A. Moreover, the Commission relies on expert testimony stating generally that a "digital detector" was not adequately disclosed in the patent and could not be built by those of ordinary skill. See, e.g., Initial determination at 77 (testimony of Ciciora: "there is no clue that any engineer of ordinary skill . . . could begin to put pencil to paper and say here is how I would build the contents of [the digital detector] block. It is completely underspecified."); id. at 79 (testimony of Williams: "[The patent] shows a digital detector. It does not go into detail of how it may work . . . .").

We conclude that the evidence relied upon by the Commission does not indicate imprecision of the claims. Instead, it is relevant, if at all, only to the sufficiency of the written description to enable the practice of the invention of the claims, which is a ground of invalidity under § 112, ¶ 1.[14] See In re Borkowski, 422 F.2d 904, 909, 164 USPQ 642, 645-46 (CCPA 1970) (noting that a claim of clear scope that is not

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[14] "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms (continued . . .)

adequately supported by an enabling disclosure commensurate with that scope is objectionable under § 112, ¶ 1, not § 112, ¶ 2); In re Ehrreich, 590 F.2d 902, 906, 200 USPQ 504, 508 (CCPA 1979) ("[§ 112, ¶ 2] pertains only to claims. . . . Agreement, or lack thereof, between the claims and the specification is properly considered only with respect to [§ 112, ¶ 1]; it is irrelevant to compliance with [§ 112, ¶ 2]"); cf. Miles Labs., Inc. v. Shandon, Inc., 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993) (dismissing the defendant's argument as "irrelevant to definiteness under § 112, ¶ 2. The invention's operability may say nothing about a skilled artisan's understanding of the bounds of the claim. [Defendant's] argument is possibly relevant, however, to the enablement requirement of § 112, ¶ 1, or to utility under § 101."). We are aware that the ALJ held the claims invalid under § 112, ¶ 1 for lack of enablement, specifically focusing on the "digital detector" limitation.[15] However, we express no opinion on any theory of invalidity under § 112, ¶ 1 because such a ground of decision is not before us as it was not reviewed by the Commission. See note 3, supra, and accompanying text. In any event, citation of evidence bearing solely on § 112, ¶ 1 infirmities does not aid the Commission in supporting the ALJ's indefiniteness holding under § 112, ¶ 2, and this holding is therefore reversed.

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as to enable any person skilled in the art to which it pertains . . . to make and use the same . . . ." 35 U.S.C. § 112, ¶ 1 (1994).

[15] See Initial Determination at 164 ("[T]he administrative law judge finds that the '277 specification does not provide reasonable detail for the 'digital detector' elements . . . and that the written description of the '277 patent specification does not communicate what is needed to enable one of ordinary skill in the art to understand and carry out the inventions of the claims in issue."). However, the Commission did not rely on this ground in support of its determination, and consequently PMC did not argue the merits of this ground in its appeal to us. See note 3, supra, and accompanying text.

C. Infringement

1. Claims 6 and 7

We understand PMC to make two arguments concerning infringement of claims 6 and 7. PMC's first argument is that the ALJ erred in construing the term "location" to preclude selection of a control signal based on selection of a particular carrier wave in a multi-carrier transmission. After considering the claim language and those portions of the specification cited to us by PMC, we disagree with PMC that the ALJ misconstrued the term "location." Without going into unnecessary detail, we note that the term "location" in claims 6 and 7 refers to the position of a control signal within a "television program transmission," and that the specification uses this phrase to denote a single transmission enveloped within a single carrier wave. The specification does not suggest that a "television program transmission" can be a multi-channel transmission, as PMC contends in support of its claim construction. The ALJ correctly construed the term "location" in accordance with the examples provided in the specification, viz., a line, or lines, or portion of a line in the vertical interval of a television video transmission, or a frequency within the audio range of a television transmission, see '277 patent, col. 9, l. 61 to col. 10, l. 16, examples which involve only single channel transmissions.

PMC's second argument is that the ALJ erred in concluding that the use of SCIDs in the accused DSSs did not infringe claims 6 and 7. We understand this argument not as an attack on the ALJ's claim construction, but rather as an argument that substantial evidence does not support the finding of noninfringement. Specifically, PMC attacks the ALJ's characterization of the SCID as a "composition" and not as having a "location," and asserts that these two characterizations are not mutually

exclusive. In other words, PMC contends that even if the SCID constitutes "composition" information, it also has a location within a given channel. The Commission responds that the ALJ's distinction between the terms "composition" and "location" is meaningful and precludes infringement of both claims.

We agree with PMC that substantial evidence does not support the ALJ's conclusion that the accused DSSs do not infringe claim 7, but disagree with PMC as to claim 6. Like PMC, we find the distinction between the terms "composition" and "location" to be irrelevant to the question whether the SCID can constitute the control signal (i.e., the "predetermined signal" of claim 6 or the "specific signal" of claim 7) of the claims. This was the ALJ's only reason for not finding infringement.[16] Moreover, the ALJ's rationale that the terms "location" and "composition" should be interpreted differently because of the separate use of those terms in claim 7, if anything, suggests that claim 7 is infringed, because that claim encompasses detection of a control signal that is facilitated by a controller that is "programmed with information of the composition of said signal or with either the varying location or the varying timing pattern of said signal." '277 patent, claim 7 (emphasis added). Once the erroneous distinction between "location" and "composition" is removed from consideration, the ALJ's conclusion that claim 7 is not infringed is left without substantial evidentiary support. However, we are not prepared on this record to conclude that this claim is infringed.

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[16] "The [ALJ] finds that the SCID of the control word packets are information of the 'composition' of a signal, rather than its 'location' as required by claim 6. Thus, the accused DSS system identifies a 'predetermined signal' based on its carrier frequency, and the composition of the predetermined signal." Initial Determination at 228; see also id. at 231-32 (discussing claim 7).

Claim 7 contains many limitations whose relevance to the accused devices have not been made clear to us. We therefore conclude that the prudent course is not to reverse the finding of no infringement of claim 7, but rather to vacate that decision and remand it for further consideration by the Commission.[17]

Claim 6 presents a different set of facts. Unlike claim 7, the controller of claim 6 is more narrowly drawn to a controller "programmed with either the varying locations or the varying timing pattern of said signal." '277 patent, claim 6. As noted earlier, the controllers in the accused DSSs are programmed with the SCIDs, which are compared with the SCIDs of the incoming data streams to locate a match.[18] Thus, the controllers are not programmed with the "varying location or timing pattern of said signal"; they are programmed with the signal itself, and therefore do not infringe. We therefore affirm the ALJ's conclusion that claim 6 is not infringed.

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[17] We again acknowledge that the Commission has not yet reviewed the ALJ's conclusions that claim 7 is invalid as anticipated under 35 U.S.C. § 102 and as not enabled under 35 U.S.C. § 112, ¶ 1. It was the Commission's prerogative to review only the questions of indefiniteness and noninfringement, and indeed such an approach "may often save the Commission, the parties and this court substantial unnecessary effort." Beloit Corp. v. Valmet OY, 742 F.2d 1421, 1423, 223 USPQ 193, 194 (Fed. Cir. 1984). However, "[l]ike many good things, that approach carries a risk—here the risk of a reversal, and a consequent need for the Commission to revisit one or more portions of the initial determination on which it had taken no position." Id.

[18] "The microprocessor [i.e., controller] will utilize the Program Guide and obtain the transponder frequency and SCID or SCIDs of the channel that the user selected. The microprocessor will program the tuner with the frequency of the desired data stream and then program the transport chip to start filtering for data packets that contain one of those particular SCIDs. The transport chip examines the SCID of every packet and compares it to the SCID or SCIDs of the selected channel. If the SCIDs match, the transport chip will direct the data of that packet to the appropriate place . . . for further processing." Initial Determination at 228 (quoting testimony of Kepley).

2. Claim 44

PMC's last argument is that the ALJ erred in concluding that the accused DSSs did not infringe claim 44. Specifically, PMC takes issue with the ALJ's implicit conclusion that the claimed "mass medium transmission" which creates the video overlay and the claimed "television transmission" are separate and discrete transmissions. PMC contends that the DSS broadcast meets both of these limitations when the DSS system is displaying the video overlay. PMC points out that even though the television is not receiving a traditional television broadcast at the time that the DSS broadcast is being received, the DSS broadcast is modulated at each given receiver. Accordingly, PMC contends that this internally-modulated signal constitutes the "television transmission" of the claim. The Commission responds, inter alia, that PMC cannot make this argument on appeal to this court because it was not included in its petition to the Commission.

We agree with the Commission and decline to consider PMC's "internally-modulated" argument. A review of PMC's petition reveals that its argument to the Commission centered around the following claim limitation: "a television receiver for receiving a selected broadcast or cablecast television transmission and transferring television programming in said transmission to a television display." PMC argued that the claim language following "a television receiver for" merely "defined the qualities (or capabilities) of the television receiver," PMC's Petition for Review at 29, and therefore should not limit the claim. It summarized its argument as follows: "Thus, when [the claim] is read in light of the specification, it's clear that the 'for' clauses in the claim should be interpreted as defining capabilities of the preceding structural elements, and

not additional structural elements required by this claim." PMC's Petition for Review at 30. Nothing even remotely approaching PMC's "internally-modulated" argument appears in the petition to the Commission. Because this argument was not raised in PMC's petition, we may not consider it on appeal. See Checkpoint Sys., Inc. v. United States Int'l Trade Comm'n, 54 F.3d 756, 760, 35 USPQ2d 1042, 1045-46 (Fed. Cir. 1995). PMC is incorrect that by raising the issue of infringement in its petition that it may now assert any argument in support of its position on that issue. See id. at 760, 35 USPQ2d at 1046 (holding that this court would not address a party's claim construction argument simply because that party had included "other claim construction defects" in its petition for review). Because PMC's "internally-modulated" argument concerning infringement of claim 44 was not "specifically asserted" in its petition for review, see id., we do not consider its merits.

CONCLUSION

The Commission erred in concluding that the "digital detector" limitations in the asserted claims rendered these claims invalid for indefiniteness under § 112, ¶ 2. The Commission also erred in concluding that claim 7 was not infringed, and we vacate this ruling and remand for further consideration of this issue. The Commission, however, did not err in concluding that claim 6 was not infringed. We decline to address PMC's argument in support of infringement of claim 44 because it was not raised below. The decision of the Commission is therefore

AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED-IN-PART and REMANDED.